

Route Development Plan

UNITED STATES ROUTE 12

From the Region boundary at Wildcat Creek (MP 165.98)

To the junction with SR 410 (MP 185.49)



Washington State Department of Transportation
South Central Region
Yakima, Washington

Route Development Plan
United States Route 12
Region Boundary at Wildcat Creek to Junction with State Route 410
MP 165.98 to MP 185.49

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Washington State Department of Transportation
South Central Region

ROUTE DEVELOPMENT PLAN

UNITED STATES ROUTE 12: MP 165.98 TO 185.49

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Vision Statement

Planning for an efficient network of transportation facilities is vital to moving people and goods, but must be balanced with the preservation of this region's wealth of natural, scenic, and recreational areas.

Introduction

The purpose of the *Route Development Plan (RDP)* is to provide further detail to the vision of Washington's Transportation Plan, in particular the 1999-2018 *WSDOT State Highway System Plan (SHSP)* element. This *RDP* is the first of a series of *RDP*'s for the section of United States Route 12 (US 12) within WSDOT's South Central Region. The section of US 12 included in this *RDP* begins at the South Central Region's western boundary of Wildcat Creek (MP 165.98) and ends at the junction with SR 410 (MP 185.49).

This document is a twenty-year plan that describes the future development of this section of US 12. A detailed description of the existing facility is provided as a basis for the present and projected operating conditions of this section of US 12. Improvement strategies are recommended that balance adequate operations with the recreational importance and environmental qualities of the transportation system in the US 12 corridor. These recommended improvements are important to assure adequate operation of US 12 in the future while preserving, to the greatest extent possible, the splendor and natural setting of the corridor.

RDP Development

This *RDP* was created with the help of an internal Stakeholder Steering Committee including representation from Project Development, Planning, Program Management, Environmental, and the Regional Administrator.

Outside Stakeholders were involved in the development of this *RDP* early in the planning process. The Yakima Valley RTPO, including representation from the cities and towns throughout the County discussed the progress of this project at their monthly meetings. This *RDP* was distributed to the RTPO member agencies, U.S. Forest Service, and the Department of Fish and Wildlife at Oak Creek for their review, comment, and verification of consistency with the MPO/RTPO Transportation Plans and local comprehensive plans. The *RDP* was also presented to the general public at an open house in order to receive public input and comments.

The *RDP* will be updated periodically to keep pace with changing transportation needs and existing conditions.

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Introduction

This document is the first of a series of Route Development Plans (*RDP*) for the section of United States Route 12 (US 12) within Washington State Department of Transportation's (WSDOT) South Central Region. This *RDP* studies the section of US 12 from the South Central Region's western boundary at Wildcat Creek (MP 165.98) to the junction with SR 410 (MP 185.49). It describes the development of US 12 and recommends improvement strategies to provide adequate operation of US 12 in the future while preserving, to the greatest extent possible, the splendor and natural setting of the corridor.

The following chapter provides a general description of this section of US 12. This information is related to specific locations in a strip map format in Chapter Seven and in tabular format in Appendix C.

Route Location

US 12 is an important west-east corridor. It begins in the west at US 101 then heads eastward across the Cascade Mountain Range. It joins I-82 at Yakima, running coincidentally until reaching the I-182 connection at Richland. It then runs coincidentally with I-182 through Pasco. After leaving Pasco, US 12 continues east to Clarkston. US 12 is 430.81 miles long. In the South Central Region US 12 is about 228 miles long and begins at MP 165.98

This route section of US 12 is a 20 mile section of the 228 mile long west-east corridor, crossing the Cascade Mountain Range and connecting Central Washington's I-82 to Western Washington's I-5. The western boundary of this section of US 12 is located about fifteen miles east of the White Pass summit, at the South Central Region's western boundary of Wildcat Creek (MP 165.98). It ends at the junction with State Route 410 (MP 185.49) where the route characteristics change as it approaches the City of Naches.

Study Area

The study area begins at the western boundary of the South Central region and ends at the junction of US 410. The highway travels through U.S. Forest Service and Washington State Department of Fish and Wildlife lands. Although there are no incorporated communities within the study area, it passes through the Rimrock Retreat community, which includes the Game Ridge Motel (MP 172.68), the Trout Lodge Cafe (MP 172.94), and residential housing units. It provides access to U.S. Forest Service Campgrounds at Hause Creek (MP 168.495), River bend (MP 168.662), Wild Rose (MP 168.898), Willows (MP 170.34) and Windy Point (MP 177.42) for camping and river floating. This section of US 12 also provides access to the Washington State Department of Fish and Wildlife's Oak Creek Wildlife Recreation Area (MP 183.44).

Terrain

This section of US 12 parallels the Tieton River and runs through a **mountainous** terrain from Wildcat Creek (MP 165.98) to the Tieton River Bridge (MP 176.29). It then continues through a **rolling** terrain to the section boundary at the junction with SR 410 (MP 185.49).

Roadside Character

The roadside character is the user's perspective of the landscape from the pavement edge to the right-of-way boundaries. It describes what you see along the road as you travel it. The classification of a facility's roadside character; whether it be Forest, Rural, Semi-urban, or Urban; is defined in the *WSDOT Roadside Classification Plan, 1996*.

The goals of the Roadside Classification Plan are to:

- 1) Promote transportation safety and management efficiency.
- 2) Minimize environmental and social impacts of transportation facility construction and maintenance.
- 3) Facilitate protection and restoration of Washington's natural environment and cultural heritage within state highway roadsides.
- 4) Promote cooperation and communication in roadside management.

The roadside classifications for the US 12 corridor are **Forest** (MP's 165.98-168.46 and 173.16-178.98) and **Rural** (MP's 168.46-173.16 and 178.98-185.49).

Travel Type

The character of traffic in this route section is mainly **interregional and recreational** travel.

Recreational destinations include the White Pass ski area, Rimrock Lake and the mountainous public lands for outdoor recreation enthusiasts. Recreational trip purposes include horseback riding, hiking, fishing, boating, and camping during the spring and summer; hunting and white water rafting in the, fall; snow sports in the winter.

History of Route

There are no relevant studies completed for this US 12 section.

The following Table 1-1 shows a brief inventory of improvements performed within the last ten years in this section of US 12:

TABLE 1-1 US 12 Route Improvement Inventory (1988 - 1998)			
Title of Contract Number	Work Description	Milepost	Date
Companion Safety Restoration (C 5378)	Guard rail, embankment widening, and signing.	165.98 - 185.32	1998
SCR Seals (C 5140)	Chip seal.	165.98 - 185.05	1997
Naches River Bridge 12/320 Replacement (C 4917)	Grade, plane, pave, remove existing bridge, and construct new bridge.	185.05 - 185.65	1996
US 12/410 Turnouts and Oak Creek Bridge (C 4234)	Grade, surface, pave, and bridgework (replaced bridge with culvert and constructed slow vehicle turnouts).	166.08 - 183.25	1993
Dist. 5 Seals and Thin Overlays (C 3848)	Chip seal and overlays.	165.98 - 178.07	1991
Soup Creek Bridge (C 3754)	Plate pipe arch (Bridge 12/310)	168.03 - 168.04	1990
Dist. 5 Seal and Stockpile	Chip seal and stockpile	178.06 - 189.76	1989

Continuity

To the west of the study area limits at Wildcat Creek (MP 165.98), US 12 enters the WSDOT Southwest Region (SWR). At this point US 12 continues through a mountainous terrain, approaching Lake Rimrock and the White Pass summit.

The SWR has completed a Route Development Plan for US 12 from MP 66.54 to MP 165.98. We will coordinate with the SWR to ensure overall route continuity.

The highway continues east through rolling terrain, and has similar route classifications and existing conditions. Traffic volumes almost double on US 12 with 2,300 (1998) Annual Average Daily Traffic (AADT) west of the junction with SR 410 (MP 185.49) and 4,200 (1998) AADT east of the junction with SR 410 (MP 185.48).

Chapter 2

Route Classifications

Introduction

The following chapter indicates the designation of this section of US 12 within various transportation systems and classifications. This information is related to specific locations in a strip map format in Chapter Seven and in tabular format in Appendix C.

Functional Classification

A roadway's functional classification indicates its character and the volume of traffic it carries. The functional classifications used on highways, from highest to lowest classification, are Interstate, principal arterial, minor arterial, and collector. The higher functional classes give more priority to through traffic and less to local access. Within the study limits of this *RDP*, US 12 is classified as **Rural Principal Arterial (R1)**.

National Highway System

The National Highway System (NHS) is an interconnected system of principal arterial routes that serves interstate and interregional travel, meets national defense requirements, and serves major travel destinations. US 12 is a mainline route in the **National Highway System**.

Scenic and Recreational Highway System

The Scenic and Recreational Highways Act of 1967 established the Scenic and Recreational Highways Program in response to the national interest in the highway beautification movement. Federal funding is available to recognized Scenic and Recreational highways to develop scenic byway programs and to accomplish corridor planning for maintaining the intrinsic qualities of the corridor.

This corridor of US 12 has been designated by WSDOT as one of Washington State's **Scenic and Recreational Highways**.

Freight and Goods Transportation System

The Freight and Goods Transportation System (FGTS) was developed in cooperation with cities, counties, and regional transportation organizations to designate the amount of tonnage

a route will carry. Routes are classified by total tonnage of freight carried per year with the designations shown in Table 2-1:

TABLE 2-1 Freight & Goods Transportation System Classification	
Route Classification	Annual Freight Tonnage
T-1	Over 10 million tons
T-2	4 million to 10 million tons
T-3	300,000 to 4 million tons
T-4	100,000 to 300,000 tons
T-5	under 100,000 tons

This US 12 section is presently identified as a “**T3**” route in the Statewide FGTS, with approximately one million freight tons transported annually.

Major commodities transported on Yakima County’s highway system include fruit, processed foods, lumber, vegetables, wood chips, and dairy products. It can be assumed that a large portion of the truck trips on US 12 is carrying these types of products.

Access Management

Access management is a technique for protecting the capacity of highways and improving safety. It accomplishes this by minimizing disruptions to “through traffic” such as eliminating unnecessary driveways and spacing them apart, managing the roadway median, spacing traffic signals, and managing turning traffic.

Typical characteristics of access management classifications for multilane facilities are as follows:

- Class 1: High speeds and volumes, long trips, serving interstate, interregional, and intercity travel. Service to abutting land subordinate to service of major traffic movements. One mile intersection spacing, minimum private connection spacing at 1320 feet, one per parcel. Restrictive where multi-lane is warranted.
- Class 2: Medium to high speeds and volumes, medium to long trips, serving interregional, intercity, and intra-city travel. Service to abutting land subordinate to service of traffic movement. Restricted to one half mile intersection spacing, minimum private connection spacing at 660 feet, or one per parcel. Restrictive where multi-lane is warranted.
- Class 3: Moderate speeds and volumes, short trips, balance between land access and mobility, serving, intercity, intra-city and intercommunity travel. Used where land use is less than maximum build-out, but development potential is high. Restricted to one half mile intersection

spacing, less with signal progression analysis, and minimum private connection spacing at 330 feet.

- Class 4: Moderate speeds and volumes, short trips, balance between land access and mobility, serving, intercity, intra-city and intercommunity travel. Used where land use is less than maximum build-out, but development potential is high. Restricted to one half mile intersection spacing, less with signal progression analysis, and minimum private connection spacing at 250 feet.
- Class 5: Low to moderate speeds, moderate to high volumes, short trips serving intra-city and intercommunity travel. Service to land access dominant function. One quarter mile intersection spacing, less with signal progression analysis, and minimum private connection spacing at 125 feet.

The access classification for US 12 is **Class 2** from Wildcat Creek (MP 165.98) to the junction with SR 410 (MP 185.49).

The Access Control Master Plan identified this section of highway as **planned partially controlled limited access**. Planned limited access is designated for sections of highways where implementation of access control is planned, but no specific plans for acquisition of access control have been approved.

Design Level

Design Matrices are used to determine the established design level and standards for planned improvement strategies. The Design Matrices reduce variability in the design process resulting in a highway system consistent with the needs of the traveling public.

The following steps are used to select and apply the design matrix:

- 1) *Select a design matrix* by identifying the route: Interstate, non-Interstate NHS, or non-NHS.
- 2) Within the design matrix, *select the row* by identifying the project type.
- 3) *Use the design matrix* to determine the design level for the design elements of the project. Apply the appropriate design levels and document the design decisions as required by the Design Manual.

Within the design matrix there are three levels of design for highway projects: Basic, Modified, and Full design levels. The matrix also identifies the associated processes and approval authority for allowing design variances.

The three levels of design are described as follows:

- *Basic Design Level:* preserves pavement structures, extends pavement service life, and maintains safe operations of the highway. This level is used on Preservation projects and includes restoring the roadway for safe operations and, where needed, may include safety enhancement.
- *Modified Design Level:* preserves and improves existing roadway geometrics, safety, and operational elements. This level is used on Improvement projects.
- *Full Design Level:* preserves and improves existing roadway geometrics, safety, and operational elements by resurfacing, rehabilitation, restoration, and reconstruction. If Full Design Level cannot be provided a Deviation is required.

Chapter 3

Existing Characteristics

Introduction

The following chapter describes the existing characteristics including lanes and shoulders, intersecting roadways, bridges and structures, and legal speed limits for this section of US 12. This information is related to specific locations in a strip map format in Chapter Seven and in tabular format in Appendix C.

Lanes and Shoulders

US 12 is a two lane undivided highway. The lane width is 11 feet and the roadway surface is bituminous surface treatment (BST) for 11 miles -- from Wildcat Creek (MP 165.98) to MP 177. The lane width then increases to 12 feet and the roadway surface changes to asphalt concrete pavement (ACP) from MP 177 to the junction with SR 410 (MP 185.49)

Shoulder widths on both sides of the roadway are predominately 4 feet. Some areas have two foot or less of paved shoulder. The shoulder surfaces are primarily a combination of bituminous and gravel surfacing.

There are five eastbound and two westbound slow vehicle lanes on this winding mountainous road. There is also one chain up lane in the westbound direction for winter travel conditions.

The specific locations of these features are shown on strip maps in Chapter Seven and in tabular format in Appendix C.

Intersections

US 12 provides local roadway connections to SR 410 and to five Forest Service roads; USFS 1306, USFS 1305, USFS 1500, USFS 1301, and USFS 1400, and one county road; Tieton Road. Additional local access is provided to various campgrounds and driveways. Details regarding intersection locations are provided in Chapter Seven and Appendix C.

Bridges and Structures

This section of US 12 includes four bridges. Bridge 12/310C (box culvert) crosses Soup Creek at MP 168.03, Bridge 12/316 crosses Tieton River at MP 176.63, Bridge 12/317 crosses Tieton River at MP 177.13, and Bridge 12/320 crosses Naches River at MP 185.28. One drainage crossing is located on this section at MP 183.43. Specific locations of these

bridges and the drainage crossing are shown on strip maps in Chapter Seven and in tabular format in Appendix C.

Posted Speeds

The posted highway speed in the western section of US 12 is 50 mph from Wildcat Creek at MP 165.98 to MP 166.08. It then increases to 55 mph from MP 166.08 to Rimrock Retreat at MP 172.52. At this point, the posted speed decreases to 45 mph. The speed limit is then increased to 60 mph from MP 173.14 to SR 410 (MP 185.49). There are 9 locations where existing curves have advisory speeds below the posted speed limit. These curves and speeds are listed below on Table 3-1:

TABLE 3-1 Posted Curve Advisory Speed		
Curve Mile Post	Posted Advisory Speed (MPH)	Posted Speed Limit (MPH)
171.91	50	55
174.70	45	55
176.38	45	55
177.85	45	60
178.22	45	60
179.24	45	60
180.89	55	60
181.81	50	60
182.63	45	60

Chapter 4

Operating Conditions

Introduction

The following chapter describes the operating conditions, including safety levels, traffic volumes, and the elements of a level of service analysis, for this section of US 12. This information is related to specific locations in a strip map format in Chapter Seven and in tabular format in Appendix C.

Safety Levels

Safety data is provided to the WSDOT by the Washington State Patrol (WSP) and recorded in the *TRIPS Standard Accident History Detail Report*. An evaluation of this data was conducted by the WSDOT to determine locations and corridors with high pedestrian accidents, high accident locations and corridors, and high risks. An improvement strategy addressing the safety deficiency identified for the US 12 corridor section has already been programmed for the 1999 - 2001 biennium.

- *Pedestrian Accident Location (PAL)* is the designation given to a highway section typically less than 0.25 miles where a two year analysis of pedestrian accident history indicates that the section has a significantly higher than average accident and severity rate *High Accident Location (HAL)* is the designation given to a highway section typically less than 0.25 miles where a two year analysis of collision history indicates that the section has a significantly higher than average collision and severity rate.
- *High Accident Corridor (HAC)* is the designation given to a highway corridor (one mile or greater in length) where a five-year analysis of collision history indicates that the section has higher than average collision and severity factors.
- *Risk* is the designation given to a highway location where geometrics, traffic volumes, and speed limits indicate a high probability of run-off-the-road accidents.

Daily Traffic Volumes

The number of vehicles that pass a given point in both directions during a specific period of time is recorded to determine Annual Average Daily Traffic Volume (AADT). Various factors multiplied against the traffic count bring seasonal, axle, and other adjustments to the traffic count based on historical counts for the previous four years. The resulting volume is averaged to incorporate discontinuity in the surrounding counts and reflect travel trends.

Traffic counts were recorded at the following four sites: Soup Creek Road, Soup Creek Bridge, Windy Point Campground, and the junction with SR 410. Daily traffic volumes are related to specific locations in a strip map format in Chapter Seven.

Truck Volumes (T-Factor)

The volume of truck traffic using the US 12 section is displayed as a percentage of truck traffic as compared to total traffic during the peak hour, which is referred to as the T-Factor. The peak hour period is defined as the maximum hourly traffic during the day from actual counts.

Truck volumes were recorded at three of the traffic count sites: Soup Creek Bridge, Windy Point Campground, and the junction with SR 410. The T-Factors for the US 12 route are related to specific locations in a strip map format in Chapter Seven.

Peak Hour Traffic Percent (K-Factor)

The percent of traffic volume in the US 12 route during the peak hour period, as compared to the average daily traffic, is the peak hour traffic percent or K-Factor (%K). The peak hour period is defined as the maximum hourly traffic during the day from actual counts.

K-Factors were recorded at each of the four traffic count sites. The K-Factors for the US 12 route are related to specific locations in a strip map format in Chapter Seven.

Directional Factor (D-Factor)

The percent of traffic volume in the US 12 route during the peak hour period in the peak direction, as compared to the total daily traffic volume, is the directional factor or D-Factor (%D). The directional factor is also referred to as the peak hour split percent. The peak hour is defined as the maximum hourly traffic during the day from actual counts.

D-Factors were recorded at each of the four traffic count sites. The D-Factors for the US 12 route are related to specific locations in a strip map format in Chapter Seven.

Average Capacity Ratio (ACR)

The method described here for evaluating transportation system performance is being adopted as part of the state's development of the Washington Transportation Plan (WTP). In 1999, the Washington State Transportation Commission adopted a congestion relief policy underlying the development of the WTP. It says that the WTP should:

"... improve travel time reliability and reduce travel delay for people and freight on the state highway system. These improvements should be measurable and noticeable to the public."

The delay methodology uses the concept of Annual Average Daily Traffic /Capacity Ratio (ACR) to describe system performance of a roadway segment. Roadway capacity is the maximum number of vehicles it is capable of serving, expressed in vehicles per hour. The resulting value represents the average vehicle demand and duration of congested conditions on a roadway segment.

The ACR values shown in the table on this page are deficiency thresholds for urban and rural roadways. Compared to traditional measures, the thresholds equate to LOS "D" operation in urban areas and LOS "C" in rural areas. A deficient segment is one whose ACR value equals or is greater than the ACR threshold. Otherwise, the segment is considered not deficient. Delay is defined as any time when the travel speed falls below the free flow speed. Free flow speeds are noted in the table:

URBAN ACR Threshold = 10	(Base) Free Flow Speed	Minimum Operating Speed Considered Acceptable	No. Hours when Average Speeds are below Free Flow Speed
Freeway-type Facility	60 mph	42 mph	7
Arterial	40 mph	18 mph	7

RURAL ACR Threshold = 6	(Base) Free Flow Speed	Minimum Operating Speed Considered Acceptable	No. Hours when Average Speeds are below Free Flow Speed
Freeway-type Facility	60 mph	57 mph	7
Arterial	40 mph	23 mph	7

WSDOT Standard

The WSDOT set the ACR standard of 6 for rural highways. At this level, traffic volume and densities are beginning to restrict drivers in their freedom to select speed, change lanes, or pass. This ACR standard applies to the section of US 12 from MP 165.98 to MP 185.49.

On urban highways, the WSDOT set the ACR standard at 10. At this level, traffic is approaching an unstable flow. Operating speeds are still tolerable, but subject to sudden variations.

Analysis Methodology

The ACR analysis involved the identification of existing traffic conditions for four distinct segments of the US 12 route, estimating twenty-year growth projections, and assessing the capacity and quality of service for these segments.

Traffic conditions were determined for the segments below:

- Wildcat Creek (MP 165.98) to Tieton Road (MP 167.91)
- Tieton Road (MP 167.91) to Tieton River Bridge (MP 176.67)
- Tieton River Bridge (MP 176.67) to Oak Creek Road (MP 183.18)
- Oak Creek Road (MP 183.18) to the junction with SR 410 (MP 185.49)

An annual growth factor of 1.021 (2.1%) was applied to historical traffic count data to estimate the base year (2000) and twenty year (2020) traffic conditions

Base Year (2000) And 20 Year (2020) ACR Ratings

TABLE 4-1 Average Capacity Ratio (ACR)			
From Milepost	To Milepost	2000 ACR Rating	2020 ACR Rating
165.98	167.91	2.68	4.42
167.91	176.67	2.76	4.54
176.67	183.18	1.55	2.56
183.18	185.49	1.08	2.98

Chapter 5

Route Development Standards

Introduction

This chapter describes the route development standards to be used for this section of US 12. Any design not covered by these Route Development Standards will use the Design Matrix.

Route Development Standards

This section of US 12 poses a great challenge to highway designers due to the terrain limitations and state and federal lands it travels through. Rugged mountainous terrain, potential wetland areas, and the Tieton River border this section of US 12. Due to the numerous geometric and environmental constraints associated with this section of US 12, the South Central Region is recommending that any improvement work done on this section of US 12, be designed to Modified Design Level standards.

Chapter 6

Improvement Strategies

Introduction

The Regional Stakeholder Steering Committee identified improvement strategies needed for the section of US 12 covered by this RDP. The following is a summary of the *1999-2019 WSDOT Highway System Plan* improvement strategies and the steering committees recommended improvements strategies.

Mobility Strategies

This section of US 12 does not have any mobility deficiencies or proposed improvement strategies identified by the steering committee or the HSP.

Safety Strategies

Currently, there are no safety deficiencies or improvements identified in HSP the for this section of US 12. In addition there are no *Collision Reduction* or *Collision Prevention* areas identified in the biennial program for this section of US 12. The steering committee has the following recommendations:

US 12 is a Statewide Bicycle Touring Route. The 1992 State Transportation Policy Plan states that “all new or substantially rehabilitated transportation facilities on a bicycle system as designated in local comprehensive plans should be designed with consideration for bicycle use as part of the scope and budget of the transportation project.” The recommended system improvement for this route to insure safe movement of bicycles and pedestrians is to provide four foot paved shoulders and 12 foot lanes.

A safety rest area is recommended in the vicinity of MP 168.50 (Hause Creek Campground). The Fish and Wildlife, and the US Forest Service request the improvement and are willing to provide their cooperation.

Oak Creek Wildlife Recreation Area draws large volumes of traffic during the winter months. The recommended improvement requested by the Fish and Wildlife is to build a westbound slip ramp located in the vicinity of MP 183.56.

There are eleven curves within this section that do not meet minimum Modified Design Level standards (see Table 5-1). Due to the existing environmental, cultural, archeological, and geometric constraints associated with these curves, as well as B/C's less than 1, the Region is recommending that the horizontal geometrics associated with these curves not be addressed and the highway designer should seek design deviations as deemed appropriate.

TABLE 6-1 Curves not meeting Modified Design Level Standards		
Curve Mile Posts	Existing Radius (ft)	Min. Modified Design Level Radius (ft)
167.42	955.0'	1100
171.27	818.6	1100
171.47	955.0	1100
172.06	790.3	1100
176.51	687.6	1100
176.88	939.3	1100
178.00	716.3	1100
178.43	701.6	1100
179.49	636.6	1100
182.02	1011.2	1100
182.84	739.4	1100

Economic Initiatives Strategies

The economic initiatives improvement strategies that are listed below are identified in the financially constrained segment of the HSP. These strategies support the economic initiatives service objectives for twenty years, from 1999-2019. The steering committee did not have any recommendations for economic initiatives.

TABLE 6-2 Economic Initiatives Improvement Strategies			
Strategy	Milepost	Vicinity	Est. Cost (millions)
Widen shoulder to 4' min., where feasible, for bicycle touring route (Traveler Services)	MP 165.98 to MP 185.49	Entire Route (See Strip Map - Chapter 7))	\$4.69-\$7.81
Replace overload restricted bridge (Reduce Freight Delay)	MP 176.63	Tieton River Bridge 12/316	Not Available
Replace overload restricted bridge (Reduce Freight Delay)	MP 177.13	Tieton River Bridge 12/317	\$1.71 (if cost effective)

It is important to note that these are conceptual planning strategies and that project scope will be refined once they reach the programming and design phases.

These improvement strategies support the following HSP's Economic Initiatives service objectives and action strategies:

- 1) ***Reduce delay to freight movement on state highways.***
 - Where cost effective, rebuild bridges that cannot carry legal overloads.
- 2) ***Provide integrated traveler services and tourism support, while encouraging partnerships.***
 - Provide a statewide network of rural bicycle touring routes with four-foot shoulders as the minimum standard (structures are not included).

Environmental Retrofit Strategies

The environmental retrofit strategy that is listed below is identified in the financially constrained segment of the HSP. This strategy supports the environmental retrofit objectives for twenty years, from 1999-2019. The steering committee did not have any recommendations for environmental retrofit strategies.

TABLE 6-3 Environmental Retrofit Improvement Strategy			
Strategy	Milepost	Vicinity	Est. Cost (millions)
Improve highway drainage structure to eliminate restriction to fish passage.	MP 168.30	Hause Creek	Not Available

It is important to note that this is a conceptual planning strategy and that project scope will be refined once it reaches the programming and design phases.

This improvement strategy supports the following HSP's environmental retrofit objective and action strategy:

Retrofit state highway facilities as appropriate to reduce existing environmental impacts.

- Remove identified fish passage barriers.

Chapter 7

Geographic Locations

Introduction

Detailed presentations of the elements described in the preceding chapters are displayed in a strip map format on the following pages.

Appendix A

Data Sources

TABLE A-1 Data Sources for Route Development Plan	
Data Element	Data Source
Route Location	WSDOT TRIPS - State Highway Log
Study Area	WSDOT TRIPS - State Highway Log
Terrain	WSDOT TRIPS - State Highway Log
Roadside Character	WSDOT Roadside Classification Plan
Travel Type	SW Region's Draft US 12 RDP
History of Route	WSDOT SCR Records Room Contract
Functional Classification	WSDOT TRIPS - State Highway Log
National Highway System	WSDOT TRIPS - Roadway
Scenic and Recreational System	WSDOT Heritage Corridors Program
Freight and Goods Transportation System	WSDOT FGTS Classification Map 1998, 1996 Traffic Report (approximate tonnage), and Eastern WA Intermodal Transp. Study
Access Management	WSDOT TRIPS - Roadway Classification, and Access Control Master Plan
Design Level	WSDOT Design Manual
Lanes and Shoulders	WSDOT TRIPS - State Highway Log
Intersections	WSDOT TRIPS - State Highway Log
Bridges and Structures	WSDOT TRIPS - State Highway Log
Legal Speeds	WSDOT TRIPS - State Highway Log
Safety Levels	WSDOT TRIPS - Standard Accident History Detail Report, and Program Management HAC, HAL, PAL, and Risk Priority list
Daily Traffic Volumes	WSDOT TRIPS - Traffic Count History
Truck Factor (T-Factor)	WSDOT TRIPS - Traffic Count History
K-Factor (%K)	WSDOT TRIPS - Traffic Count History
Directional Factor (%D)	WSDOT TRIPS - Traffic Count History
Level of Service	Highway Capacity Manual Software
Route Development Standards	Internal Stakeholders Committee
Improvement Strategies	State Highway System Plan

Abbreviations

<i>ACP</i>	Asphalt Concrete Pavement
<i>BST</i>	Bituminous Surface Treatment
<i>MPH</i>	Miles Per Hour
<i>OSC</i>	Olympia Service Center, WSDOT
<i>SCR</i>	South Central Region, WSDOT
<i>SWR</i>	Southwest Region, WSDOT
<i>SHSP</i>	State Highway System Plan
<i>SR</i>	State Route
<i>US</i>	United States Route
<i>TRIPS</i>	Transportation Information and Planning Support
<i>WSDOT</i>	Washington State Department of Transportation

Definitions

Access Control

Access control is established to preserve the safety and efficiency of specific highways and to preserve the public investment. Control of access is affected by acquiring rights of access from abutting property owners, and by selectively limiting approaches to the highways.

Annual Average Daily Traffic (AADT)

The total traffic volume (both directions) that traveled over a highway segment during a one year period divided by the number of days in the year.

Average Capacity Ratio (ACR)

The new method adopted in 1999 for evaluating transportation system performance as part of the state's development of the Washington Transportation Plan (WTP). The ACR value is the AADT/C Ratio of a roadway segment.

Directional Factor (%D)

The Directional Factor, or peak hour split, is the maximum hourly traffic during the day from actual counts by direction. This figure represents the percent that peak hour traffic directional volume is of total traffic volume.

Freight and Goods Transportation System (FGTS)

The FGTS is a system of state, county and city routes that serve the transportation of products within the state and connects to freight routes in adjoining states and the Province of British Columbia. WSDOT pavement engineers in cooperation with local government engineers established classifications representing the annual gross tonnage of freight and number of large trucks per day.

Functional Classification System

The federal designation indicating a route's character and the volume of traffic it carries.

High Accident Corridor (HAC)

A highway section one mile or greater in length where a five year analysis of collision history indicates that the section has higher than average collision and severity factors.

High Accident Location (HAL)

A highway section typically less than 0.25 of a mile with a two year analysis of collision history indicating that the section has a significantly higher than average collision and severity rate.

K-Factor (%K)

The K-Factor, or peak hour, is the maximum hourly traffic during the day from actual counts. This figure represents the percent that peak hour is of Average Daily Traffic volume.

Level of Service (LOS)

A qualitative measure that incorporates the collective factors of speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs provided by a highway facility under a particular volume condition.

Metropolitan Planning Organization (MPO)

The agency designated by the Governor to administer the federally required transportation planning process in a metropolitan area. An MPO must be in place in every urbanized area over 50,000 in population. The MPO is responsible for the 20-year long-range plan and the Transportation Improvement Program.

Mile Post (MP)

The state highway mile designation, beginning with zero on the southern terminus of a north/south route (odd numbered routes) and the western terminus of an east/west route (even numbered routes).

National Highway System (NHS)

A system designated by Congress that contains all interstate routes, a large percentage of urban and rural principal arterials, and strategic highways and connectors.

Pedestrian Accident Location (PAL)

A highway section typically less than 0.25 of a mile with a two year analysis of pedestrian accident history indicating that the section has a significantly higher than average accident and severity rate.

Planned limited access partial control

The designation for sections of highways where implementation of access control is planned, but no specific plans for acquisition of access control have been approved.

Regional Transportation Planning Organizations (RTPO)

Authorized by the legislature in 1990 as part of the Growth Management Act. They are voluntary organizations with representatives from state and local governments to coordinate transportation planning activities within a region. MPO's also function as a regional transportation planning organization.

Risk

A highway location where geometrics, traffic volumes, and speed limits indicate a high probability of run-off-the-road accidents.

Roadside Character

The general character of the roadside landscape, assessed according to the roadway user's visual perspective. Roadside character is the basis for roadside character classification.

Route Development Plan (RDP)

A long-range plan for a specific highway corridor that describes existing highway conditions, local land use plans, and recommends improvements and goals for future improvements and transportation services. The plan is developed through cooperative efforts with affected city, county and regional agencies.

Section

The study limits of United States Route 12 are between MP 165.98 to MP 185.49.

State Highway System Plan (SHSP)

The state highway element of the Statewide Multimodal Transportation Plan. The State Highway System Plan forms the basis for development of future state highway programs, projects, and budgets. The plan defines service objectives and proposes strategies for maintaining, preserving, and improving state highways.

T-Factor

The percentage of truck traffic as compared to total traffic during the peak hour, which is referred to as the T-Factor. The peak hour period is defined as the maximum hourly traffic during the day from actual counts.

Appendix C

Geographic Elements

Tables C-1 through C-5 show route descriptions, classifications, and characteristics that are displayed on the maps in Chapter 7.

TABLE C-1 Route Description

Segment Mile Posts	Terrain	Roadside Character
165.98-176.29	mountainous	
176.29-185.49	rolling	
165.98-168.46		forest
168.46-173.16		rural
173.16-178.98		forest
178.98-185.49		rural

TABLE C-2 Route Classifications

Segment Mile Posts	Functional Classification	NHS	Scenic & Rec. Hwy	FGTS	Access Manage ment.
165.98- 185.49	Rural Principal Arterial	NHS Mainline Route	Scenic & Rec. Hwy	T3	Planned Limited Access Partial Control Class 2

Segment Mile Posts	1999 AADT	% Trk	%K	%D	2000 ACR	2020 ACR
165.98-167.91	2,168	N/A	10.5%	53.8%	2.68	4.42
167.91-176.67	2,169	10.7%	11.0%	58.8%	2.76	4.54
176.67-183.18	2,200	13.6%	9.3%	55.8%	1.55	2.56
183.18- 185.49	2,348	14.4%	10.3%	51.9%	C	C

TABLE C-4 Existing Characteristics: Intersections, Features, & Speeds

Mile Posts	Intersections & Features	Posted Speed Limit (mph)
165.98		50
166.08		55
166.17	USFS 1306 (Wildcat Road), left	
167.89	USFS 1305 (Soup Creek Road), left	
167.91	Tieton Road, right	
168.03	Soup Creek Bridge 012/310C, beginning	
168.04	Soup Creek Bridge 012/310C, end	
168.31	USFS 1500 (Bethel Ridge Road), left	
168.34	Forest Service Road 130040, left	
168.41	Forest Service Ranger Station, left	
168.46	Forest Service Ranger Station, left	
168.50	Hause Creek Campground, right	
168.53	Forest Service Road 130040, left	
168.66	River Bend Campground, right	
169.81	Wild Rose Campground, right	
169.86	Wild Rose Campground, right	
170.33	Willows Campground, right	
170.72	Forest Service Road 2923, left	
172.52		45
172.64	Entrance to Rimrock Retreat	
172.99	Entrance to Rimrock Retreat	
173.14		60
173.63	Tieton River Bridge 012/316, beginning	
176.67	Tieton River Bridge 012/316, end	
177.07	Forest Service Road , right	
177.13	Tieton River Bridge 012/317, beginning	
177.16	Tieton River Bridge 012/317, end	
177.43	Windy Point Campground, right	
178.86	USFS 1301 (Bear Canyon Road), left	
183.18	USFS 1400 (Oak Creek Road), left	
183.43	Drainage Crossing	
183.45	Oak Creek Wildlife Recreation Area, left	
185.28	Naches River Bridge 012/320, beginning	
185.34	Naches River Bridge 012/320, end	
185.44	US 12 & junction with SR 410, both	

TABLE C-5 Existing Characteristics: Geometrics

Mile Post	Special Use Lanes	Shoulders	Roadway Width
165.98		4', both, G	22', B
166.09	12' Slow Vehicle Lane, beginning, right, B	2', both, B	34', B
166.13	12' Slow Vehicle, right, 12' Chain up, beginning, left B		46', B
166.17	12' Slow Vehicle, right, 12' Chain up, left B		
166.27	12' Slow Vehicle, right 12' Chain up, end, left B	4', left, G / 2', right, B	34', B
166.33	12' Slow Vehicle Lane, end, right, B	4', both, G	22', B
167.47		3', left, B / 2', right, B	
167.98		4', both, G	22', B
169.77	12' Slow Vehicle Lane, beginning, right, B	4', left, G	34', B
169.81	12' Slow Vehicle Lane, right, B		
169.86	12' Slow Vehicle Lane, right, B		
170.00	12' Slow Vehicle Lane, end, right, B	5', left, G / 8', right, G	22', B
172.68		4', left, G 10', right, G	
173.03		4', both, G	
174.95	13' Slow Vehicle Lane, beginning, right, B	4', left, G / 1', right, B	35', B
175.19	13' Slow Vehicle Lane, end, right, B	4', both, G	22', B
175.90	13' Slow Vehicle Lane, beginning, left, B	1', left, B / 4', right, G	35', B
176.10	13' Slow Vehicle Lane, end, left, B	4', both, G	22', B
176.63		no shoulders - Curb	24', P
176.67		4', both, G	22', B
177.13		no shoulders - Curb	24', B
177.16		4', left, B / 3', right, B	22', B
177.21	11' Slow Vehicle Lane, beginning, right, B		33', B
177.42	11' Slow Vehicle Lane, end, right, B		22', B
177.63		4', both, G	
180.56	13' Slow Vehicle Lane, beginning, right, B	4', left, G	35', B
180.58	13' Slow Vehicle Lane, right, B / 12' Slow Vehicle, beginning, left, B	None (SR View shows same as above)	47', B
180.71	13' Slow Vehicle Lane, end, right, B / 12' Slow Vehicle, left, B	None (SR View shows taper RT)	10.36m(34'), B
180.75	12' Slow Vehicle, end, left, B	4', right, G / (SR View shows taper LT)	
180.81		4', both, G	22', B
183.10		2', left, B / 6', right, B	30', B
183.21		4', both, G	22', B
184.95		4', right, G	
184.98		None (SR View shows same as above)	
185.05		8', both, A	24', A
185.28		no shoulders - wall	40', P
185.34		8', both, A	24', A

Appendix D

Level of Service Analysis

The following tables show the elements used in the level of service analysis for this section of US 12.

Table D-1 shows the segments of this section of US 12 that were identified for performing this analysis. Traffic count locations, intersections, and terrain changes were evaluated to help determine the most logical level of service segments.

TABLE D-1 Traffic Analysis			
Segment Mile Posts	Count Location	Description	Terrain
165.98- 167.91	MP 167.89	Wildcat Creek to Tieton Rd.	Mountainous
167.91- 176.67	MP 168.03	Tieton Rd. to Tieton River Bridge	Mountainous
176.67- 183.18	MP 177.43	Tieton River Bridge to Oak Creek Rd.	Rolling
183.18- 185.49	MP 185.44	Oak Creek Rd. to jct. with SR 410	Rolling

Tables D-2 through D-4 show the calculations used in determining the average percent of no passing zones. SR View, an application used to view an image database of State Highways, was used to determine the no passing zones.

TABLE D-2 Percent of No Passing Zones - Eastbound			
Segment Mile Posts	Passing Zones	No Passing Zones	% No Passing
165.98-167.91	165.98-166.30 166.56-166.77 167.57-167.78	166.30-166.56 166.77-167.57 167.78-167.91	61.7%
167.91-176.67	168.35-168.61 169.72-169.92 172.27-172.59 173.17-173.28 174.90-175.19 175.82-176.02	167.91-168.35 169.92-172.27 172.59-173.17 173.28-174.90 175.19-175.82 176.02-176.67	84.2%
176.67-183.18	176.98-177.49 179.97-180.21 180.50-180.77 180.90-183.16	176.67-176.98 177.49-179.97 180.21-180.50 180.77-180.90 183.16-183.18	49.6%
183.18-185.49	183.60-184.18	183.18-183.60 184.18-185.49	74.9%

TABLE D-3 Percent of No Passing Zones - Westbound			
Segment Mile Posts	Passing Zones	No Passing Zones	% No Passing
165.98-167.91	166.86-167.38 167.64-167.91	165.98-166.86 167.38-167.64	59.1%
167.91-176.67	167.91-167.92 168.54-168.82 169.92-170.15 172.49-172.67 175.07-175.32 175.93-176.26	167.92-168.54 168.82-169.92 170.15-172.49 172.67-175.07 175.32-175.93 176.26-176.67	85.4%
176.67-183.18	177.18-177.49 180.20-180.44 180.64-180.99	176.67-177.18 177.49-180.20 180.44-180.64 180.99-183.18	85.3%
183.18-185.49	183.18-183.44 183.82-184.37	183.44-183.82 184.37-185.49	64.9%

TABLE D-4 Average Percent of No Passing Zones			
Segment Mile Posts	EB % No Passing	WB % No Passing	Average % No Passing
165.98-167.91	61.7%	59.1%	60.4%
167.91-176.67	84.2%	85.4%	84.8%
176.67-183.18	49.6%	85.3%	67.4%
183.18-185.49	74.9%	64.9%	69.9%

Tables D-5 and D-6 provide the current traffic volumes and factors used to project base year and future year traffic volumes. The annual compound growth factor for Yakima County was applied to the historical traffic volumes to determine a base year traffic volume and a twenty year forecasted traffic volume. The vehicles per hour or the design hour volume (DHV) were calculated for each level of service segment by multiplying the AADT by the peak hour traffic percent (%K).

TABLE D-5 AADT and Related Factors				
Segment Mile Posts	AADT	Count Date	Growth Factor	%K
165.98-167.91	2,000	1995	1.021	10.5%
167.91-176.67	1,926	1993	1.021	11.0%
176.67-183.18	2,155	1998	1.021	9.3%
183.18-185.49	2,300	1998	1.021	10.3%

TABLE D-6 AADT and DHV Projections				
Segment Mile Posts	1999 AADT	1999 DHV	2019 AADT	2019 DHV
165.98-167.91	2,168	228	3,079	323
167.91-176.67	2,169	238	3,080	338
176.67-183.18	2,200	205	3,124	291
183.18-185.49	2,348	242	3,335	343

Table D-7 indicates the factors used for estimating the percent of truck volumes, percent of RV volumes, the peak hour factor, and the directional factor.

TABLE D-7 Truck, RV, Peak Hour, and Directional Factors					
Segment Mile Posts	% Trk	% Truck Assumption	% RV Assumption	PHF	% D
165.98-167.91	-----	5.3%	5.3%	0.87	53.8%
167.91-176.67	10.7%	5.3%	5.3%	0.87	58.8%
176.67-183.18	13.6%	6.8%	6.8%	0.87	55.8%
183.18-185.49	14.4%	7.2%	7.2%	0.87	51.9%